Do Politicians Free-ride? An Empirical Test of the Common Pool Model

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Abstract

In the twentieth century there was a significant trend towards larger local governments through amalgamations in the western world. Amalgamations provide potential economic benefits but might also give rise to costs driven by opportunistic political behavior. This study uses a compulsory amalgamation reform of municipalities in Sweden to test for such behavior. The reform gives a local government incentives to accumulate debt before the amalgamation takes place, since the cost will be shared by all tax payers in the new municipality. The strength of this incentive to free ride will be determined by the locality's population size, relative to the future size of the new locality. We find an economically large and statistically significant free riding effect and the result is robust.

Keywords: common pool; amalgamations; free riding; local government; difference-in-difference.
JEL codes: D72, E62, H70

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1 Introduction

In the twentieth century there was a trend in the western world towards larger local governments through amalgamations.[1] In Sweden, municipalities have been subject to amalgamation reforms twice in the last sixty years. Amalgamation reforms have, among other countries, also been carried out in USA, Canada, Norway and Australia. Amalgamations of local governments are still regarded as attractive and recently Denmark 275 municipalities amalgamated into less than 100 as of January 1, 2007. The arguments advanced by the proponents of amalgamations are centered around economics of scale in service production and the administration of government, economics of scope and other more subtle "bigger is better"-arguments.[2] Larger governments are supposed to be more efficient. Yet, previous studies of amalgamations provide little empirical evidence in favor of increased efficiency.[3] In addition to what has previously been studied, amalgamations may also have potential drawbacks before the amalgamation occurs. Specifically, a forward-looking politician may borrow and overspend before the amalgamation takes place, since the pool of future taxes can be viewed as a common pool. Moreover, the smaller a locality's population size, relative to the size of the new locality, the stronger is the incentive to free ride on the common pool of future taxes. Hence, the increase in per capita debt due to amalgamations should be larger for relatively small than for relatively large localities.[4]

The contribution of this paper is to empirically quantify the size of the free riding behavior caused by amalgamations. To this end, I use a very large amalgamation reform in Sweden which reduced the number of local governments from 848 to 278 over the period 1969-1974. There are a number of features, other than the very large number of amalgamations, which make this reform attractive from an econometric evaluation point of view. First, the localities were forced to amalgamate by law and the law imposed variations in the incentives to free ride. Thus, it is possible to implement a difference-in-difference approach when evaluating the impact of the reform on the behavior of local governments. Second, some localities did amalgamate before others, which can be used to provide additional evidence on the free riding behavior, since the localities that amalgamate later

[1] See Sancton (2000) for a comprehensive study on the subject.

[2] See Dollery, Crase and Byrnes (2006) for a discussion.

[3] The evidence is clearly mixed and many studies point out that amalgamations in fact seem to increase costs. See Bish (2001) for a comprehensive survey on this matter regarding USA and Canada. See Dollery et al. (2006), Dollery and Crase (2004) and Byrnes and Dollery (2002) for results and references regarding amalgamations in Australia. See Groes (2005) for studies in Denmark. For mixed results with regard to Sweden see Nelson (1992) and Hanes (2003).

[4] In the political science literature, there exist comments on the fact that municipalities might "misbehave" before the amalgamation but, to my knowledge, this has not been further analyzed. Independently of this paper, Jordahl and Liang (2006) have recently studied a previous amalgamation reform in Sweden. However, the implementations and the nature of the reforms are very different. See Wångmar (2003) for an excellent analysis.

have more time to exploit the common pool. Third, the reform was largely based on measurable characteristics, which allows a test for whether the amalgamations were "as good as randomly assigned". In other words, controlling for these characteristics should have little effect on the estimated free riding effect if our empirical strategy is reasonable. Fourth, Swedish local governments have a large degree of fiscal freedom, which makes the amalgamation reform a useful testing ground for the common pool problem.

I find strong support for amalgamations giving rise to a common pool problem. The estimated effect is both statistically and economically significant. A locality with a very strong incentive to free ride increases its per capita level of debt by approximately 26 % more than a locality with no incentives to free ride, everything else equal. Moreover, the localities with more time to free ride increase their debt more, thereby holding the incentive to free ride constant. The results are robust to a number of specification checks.

This paper is related to a number of different literatures with a common pool feature, i.e. where the costs are dispersed but the benefits concentrated. Specifically, it is related to models relating council size or incidence of coalitions to government spending, which have been widely used in the theory of political economy. However, the empirical evidence is mixed and this paper provides a novel and very different testing ground for the common pool model.[5] The study also relates to the vast literature with similar incentive schemes, where politicians potentially do not internalize the whole cost of their spending decision. The literature on weak budget constraints and budgetary rules provides similar situations.[6] Finally, empirical studies on corporate mergers typically conclude that these seem unprofitable.[7] Clearly, the same types of incentives are at hand in the private sector when companies engage in mergers.[8]

The outline of this paper is as follows. The next section develops a basic common pool model. The third section provides information and a background of the amalgamation reform. In the fourth section, data and the empirical framework are discussed. The main results are presented in section five. Section six extends the empirical analysis and robustness checks are carried out. Section seven concludes the paper.

[5]The idea of common pool problems in politics goes back to Tullock (1959) and Buchanon and Tullock (1962) and is formalized in Weingast, Shepsle and Johnsen (1981). For more recent studies see, for example, Baqir (2002), Bradbury and Crain (2001), Gilligan and Matsusuaka (2001), Perotti and Kontpoulos (2002), Petterson-Lidbom (2003) and Persson and Tabellini (2003).

[6]Kornai (1979) provides a theory for soft budget constraints. See Pettersson-Lidbom and Dahlberg (2005) for recent empirical test. For a survey on the literature of budgetary institutions see Persson and Tabellini (2002).

[7]Even though share prices seem to rise. See, for example, Fridolfsson and Stennek (September 2005).

[8]Investigating the free riding effect in the private sector is complicated, since mergers are not mandatory.

2 A Simple Model of the Common Pool Problem in Amalgamations

This section develops a stylized common pool model in line with Persson and Tabellini (1994). The purpose of the model is to motivate the empirical analysis, that is, derive a relationship between a locality's level of debt and the incentive to free ride due to a common pool problem. Debt is introduced to fund spending in the first period in order to generate a relation between debt and the strength of the incentive to free ride.[9]

Consider a setting consisting of municipalities $i = 1, 2, ...Q$ that will amalgamate in the future. The population size of a municipality is N^i and $\sum_{i=1}^{Q} N^i = N$. In period one, the municipalities are independent. In period two, the municipalities are forced to amalgamate, which is publicly known in period one. Individuals have quasi-linear preferences over private utility according to

$$u^i = c_1^i + c_2^i + V\left(x_2^i\right), \tag{1}$$

where c_t^i is private consumption in period $t = 1, 2$ and x_2^i is leisure in period two for an agent i and $V(\cdot)$ is well behaved.[10] Individuals are identical, except for the geographic parameter i. For simplicity, we assume that individuals' only way of saving is through lending to the municipality in the first period, where the debt is honored in the second period. Let τ be the tax rate in period two. R is the gross interest rate and b^i is the per capita holding of municipal debt and e^i is initial endowment. l^i is labor where $l^i + x^i = 1$. In period one, the consumer chooses the level of saving and in the second period, the consumer chooses leisure and consumption. In the absence of discounting and given the linearity of the utility function, we must have $R = 1$ for an interior solution $b^i \in [0, e^i]$. Hence, the intertemporal budget is:

$$c_1^i + c_2^i = e^i + (1 - \tau) l^i. \tag{2}$$

Maximizing (1) w.r.t. x_2^i, s.t. (2) yields the necessary conditions for a private equilibrium and the optimal labor supply function:

$$l^{i*} = 1 - x_2^{i*} = 1 - V_{x_2^j}^{-1}(1 - \tau) \equiv L^i(\tau),^{11}$$

Now consider the public spending dimension of the problem. In the first period, regions act independently. In the second period they amalgamate, so the debt of the

[9] I will assume universalism. The structure of the reform, where all municipalities do have the full power of the spending decisions, gives at hand that this is a reasonable assumption. In fact, the strong underlying assumptions of the decision procedure do correspond to the institutional setting in this case.

[10] I follow Persson and Tabellini (2002) by first solving for the private equilibrium and then introducing the political dimension.

[11] Note $L_\tau^i(\tau) = \frac{1}{V_{x_2 x_2}\left(x_2^i\right)} < 0$. So higher tax rate distorts the labor-leisure choice.

old independent municipalities is inherited by the new unit. The local government i can only borrow to provide public goods in the first period and thus, the budget constraint in period one is simply $N^i g^i = N^i b^i \iff g^i = b^i$. For period two, the budget constraint, imposing $R = 1$, $l^{i*} = L^i(\tau)$ and assuming that public good provision is zero in the second period, is

$$\sum_{i=1}^{Q} N^i b^i = N\tau l = N\tau L^i(\tau) \Rightarrow \sum_{j=a,b} \frac{N^i}{N} b^i = \tau L(\tau). \tag{3}$$

Since the tax rate determines the private equilibrium and by (3), we can describe the private equilibrium in the policy variables $\sum_{i=a,b} \frac{N^i}{N} b^i \equiv B$, the private indirect utility function becomes

$$u^* \equiv \max \left[c_1 + c_2 + V(x_2)\right] = e + (1-\tau) L^i(\tau) + V(1 - L^i(\tau)) \equiv W(B).^{12} \tag{4}$$

Preferences for public spending are assumed to be

$$w^i = W(B) + H(g^i) = W(B) + H(b^i), \tag{5}$$

where $H(.)$ is well behaved. Solving backwards, imposing repayment of the debt in period two, we have the optimal condition as $B = \tau L(\tau)$ in period 2. In period one, incumbent i maximizes (5) w.r.t. g^i. Hence, the necessary conditions are

$$H_g(b^i) = -\frac{N^i}{N} W_B(B) < -W_B(B), \tag{6}$$

where $H_g(b^i)$ is the marginal utility of the good provided and $-\frac{N^i}{N} W_B(B)$ is the municipal marginal cost of borrowing. Note that this is smaller than the marginal cost of borrowing for the amalgam, $-W_B(B)$. Thus, spending on public goods in the first period and thus borrowing are too high compared to the social optimal level of borrowing, which is the classical common pool result and the smaller the relative size, the larger are the incentives to borrow, everything else constant.

To summarize, the model implies that borrowing should be negatively related to $\frac{N^i}{N}$ where N^i is the current population size of locality i and N is the population size of the future locality. Hence, the smaller is the current population size of a locality, relative to the size of the new locality, the stronger is the incentive to free ride.

[12] Note $u^*_\tau = -L(\tau) + L_\tau(\tau)(1-\tau) + V_L L_\tau(\tau) < 0$, and we must have $W_B(B) \leq W_{b^i}(B) < 0$, and $W_{b^i}(B) = W_B(B)\frac{N^i}{N} < W_{b^j}(B) = W_B(B)\frac{N^i}{N}$ if $N^i > N^j$ for $i \neq j$.

3 The Swedish Amalgamation Reform

This section discusses the background to the Swedish Amalgamation Reform that reduced the number of municipalities from 848 to 278 during the period 1969 to 1974. Moreover, some features of Swedish municipalities are presented.

In 1959, a committee of experts was appointed by the Swedish parliament to analyze the effectiveness of local governments.[13] In 1962, the committee concluded that most municipalities were too small to provide efficient services and suggested an amalgamation reform as a solution. Moreover, the reform should be guided by the principle that the new municipalities were to be constructed around economic/geographical centers, i.e., places with a dense population. The new municipalities should have at least 8000 inhabitants in the long run and they should also be more dispersed with respect to occupational character. The logic was that the agricultural sector's part of the economy was decreasing in favor of the manufacturing sector and particularly the services sector. The committee considered both the tax base and the tax rate and argued that a harmonization between municipalities was desirable. However, initial geographic factors could not be stretched too far. A municipality from the southern part of Sweden could not, in practice, amalgamate with a municipality from the northern part, i.e., a municipality should not be geographically divided. This meant that a large municipality that was located in between small municipalities might be subject to the amalgamation reform because of its placement; consequently approximately 96 % of the municpalities were subject to the reform. The proposal prescribed voluntary amalgamations, since it was assumed that the municipalities would realize the gains of becoming larger. The parliament accepted the committee report in 1962 in general, but added that splitting old municipalities should be avoided. In the years following after 1962, the Swedish government constructed the new units based on the mentioned principles, the so-called municipality blocks. However, the blocks had no legal meaning. They were theoretical constructs, but with the creation of these, the government supposed that municipalities would merge into these blocks on a voluntary basis. In 1965, Statistics Sweden began to publish statistics for these theoretically constructed units (282 altogether).[14] However, the vast majority of the municipalities were reluctant to amalgamate.[15] The Swedish government, led by the Social Democratic Party, was not satisfied with the response of the municipalities and decided to make the amalgamations mandatory but without changing the key elements of the previous proposal.[16] The law of 1969 forced the municipalities to amalgamate in line

[13] See SOU1961:9 (1961) and Bet.KU1962:1 (1962).

[14] The construction was finished in 1964. 38 old municipalities were defined as not being subject to the amalagamation.

[15] Only 35 of the new municipalities had been completed in 1969. Nevertheless, more than 35 amalgamations took place in the period; 290 municipalities that existed in 1962 disappeared within the voluntary period and 119 new muncipalities were created, but out of these 119 only 35 reached the complete status.

[16] See Prop.1969:103 (1969). However, the number of municipality blocks dropped by 7 to 275 and some

with the constructed municipality blocks before the beginning of 1974. However, it was up to the municipalities in the specific block to decide whether to amalgamate at the end of 1970 or at the end of 1973, henceforth denoted 1970/71 and 1973/74. In 1969, Sweden consisted of 848 municipalities. In 1970/71, 525 amalgamated into 141 new units. So at the beginning of 1971 there were 464 municpalites. At the end of 1973, 268 municipalities amalgamated into 82 new units. At the beginning of 1974, Sweden consisted of 278 municipalities.

In addition to the extensive amalgamation reform, Swedish municipalities have attractive features for studying the common pool problem. First, Swedish municipalities have a constitutional right of self governance.[17] They can decide on income taxation, planning of local land, impose some local fees and freely take up short-term debt and the municipal economy is a substantial part of the Swedish economy. In 1970, the municipal share of GDP measured as consumption and investments was approximately 17 %, a share that has remained rather stable ever since.[18] Second, all Swedish municipalities are governed by the same laws and institutions, which makes them favorable as units of analysis. There were some restrictions on the use of long-term debt until 1979. A municipality could not take up long term debt for consumption and the loan should be aimed at accumulating long-term assets. Moreover, the loan was to be used to acquire resources regarded to be in the municipal political sphere, i.e. building schools or sports stadiums but not military investments, for example. In general, the loan had to be approved by the central government but as long as the mentioned principles were fulfilled, the government could not disapprove and there is no evidence of the central government ever denying an application.[19]

To sum up, the amalgamation reform has its origins already in 1962 but the amalgamation was voluntary until 1969. Approximately, only 4 % out of all municipalities in 1964 were regarded as not having to amalgamate but few municipalities chose to amalgamate. In 1969, the Swedish government decided on mandatory amalgamation. The decision was taken with a slim majority in the Swedish Parliament. A majority of the municipalities also protested but very small changes were made to the theoretically constructed

minor changes were made. Protests from municipalities were common but in general, the municipalities did not have any succes when objecting to the law. See Nielsen (2003) for a summary or, specifically, Wallin (1973). However a few municipalities were succesful in their protests and did avoid amalgamation. In comparison with the publications of 1965 Dals-Ed, Svedala, Staffanstorp, Bara, Burlöv, Mullsjö, Orsa, Sundbyberg, Solna, and Håbo. Moreover, 6 municipalities that were regarded as large enough in 1965 actually amalgamated. Thus, 42 municipalities are stable over the whole period.

[17] This is true also in practice, which has been shown in several studies. See, for example, Pettersson-Lidbom (2001) and Petterson-Lidbom (2003) for evidence on autonomy and more thorough descriptions of the funtions of Swedish municipalities.

[18] This share also includes county councils("landsting") activities.

[19] The logic was that the utility of an investments would also be enjoyed by future tax payers. Some exceptions to the general rule of state approval existed, for example for investments in water and sanitary projects. See Gustafsson (1984) and Wallin, Andersson and Andrén (1973).

municipality blocks of 1964. After the amalgamation, Sweden had 278 municipalities in 1974.

4 Empirical Framework and Data

In this section, I first describe the empirical framework and motivate why a difference-in-difference approach is appropriate. Then, I describe the data used in the subsequent analysis.

The basic common pool model in section 2 suggests that the level of per capita debt of municipality i should be regressed on its population size before the amalgamation, relative to the population size of the new municipality, $\frac{N^i}{N}$, since it determines the municipal marginal cost of borrowing. For expositional purposes, let us define the incentive to free ride, $Freeride = 1 - \frac{N^i}{N} \in [0.1)$.[20] We could then write

$$Debt_i = \alpha + \beta Freeride_i + u_i, \tag{7}$$

where u measures all other determinants (observed or unobserved) of debt. The parameter of interest is β - the free riding effect due to the common pool problem. The Swedish amalgamation reform provides us with the required variation in $Freeride$. However, there are to likely to exist unobserved differences across the municipalities before the reform which may be correlated with both $Debt$ and $Freeride$, which would bias the estimated effect in equation (7). Thanks to the way in which the amalgamation reform was implemented, a difference-in-difference (DID) approach van be used. Before 1969, amalgamations were only voluntary but they became mandatory in 1969. This suggests that one can take the difference between the year before the amalgamation came into effect (i.e., either in 1970 or 1973) as the final year and the year before the law was imposed (i.e. 1968) as the pre-treatment year to test the free riding effect. If the treatment $Freeride$ was a binary indicator, i.e. 1 for the municipalities amalgamating and 0 for those not amalgamating, the β can be characterized as follows, where upper bars denote means:

Figure 1
DID - Binary Treatment

	After Law	Before Law
Amalgamating (1)	$\overline{\overline{Debt}}_{am.year,1}$	$\overline{\overline{Debt}}_{1968,1}$
Not amalgamating (0)	$\overline{\overline{Debt}}_{am.year,0}$	$\overline{\overline{Debt}}_{1968,0}$
$\beta =$	$\left(\overline{\overline{Debt}}_{am.year,1} - \overline{\overline{Debt}}_{1968,1}\right) -$	$\left(\overline{\overline{Debt}}_{am.year,0} - \overline{\overline{Debt}}_{1968,0}\right)$

[20] It is convenient to formulate the relationship as positive, since we can then refer to an increase in the coeffient instead of an increase in the magnitude or an increase in absolute value.

However, since our model gives at hand that $Freeride$ is continuos, equation (7) becomes

$$\Delta DEBT_{it} = \theta + \beta \Delta Freeride_{it} + v_{it}, \tag{8}$$

where Δ is the difference operator; either the difference between 1970 and 1968, or between 1973 and 1968 depending on whether a municipality amalgamated in 1970/71 or 1973/74. Since the reform only affected the municipalities after 1969 but not before1969, $\Delta Freeride = Freeride$. Thus, one can be estimated (8) as

$$\Delta DEBT_{it} = \theta + \beta Freeride_{it} + v_{it}. \tag{9}$$

We can also include pre-reform characteristics as control variables in (9). These characteristics can be used for testing whether the variable of interest, i.e., $Freeride$, is "as good as randomly assigned". Thus, these controls should not affect the estimated free riding effect unless the reform is correlated with the error term. Adding controls are also motivated from an efficiency point of view. An implicit assumption of the difference-in-difference approach is that the municipalities that were affected by the amalgamations should have had similar trends in the level of debt before 1968 as those municipalities that were not affected. As a matter of fact, below I present evidence suggesting that they do have similar trends in the level of debt before 1968.

The data set consists of all Swedish municipalities from 1962-1974 and is constructed from official statistics provided by Statistics Sweden. I have collected data based on the report of 1962. The data is an unbalanced panel where a municipality that amalgamates merges into the new municipality in the next year.[21] Furthermore, in the main analysis, the new amalgams of 1971 are dropped, since the behavior after the amalgamation might be affected by previous opportunistic behavior by the amalgamating partners. For a more detailed description of sources and definitions, see Appendix.

Table I shows a summary of important variables for the 848 municipalities that existed in 1969. Except for the variable of interest, $Freeride$, and the dependent variable, $\Delta DEBT$, I report 1962 year values for the variables mentioned by the committee. The variables reported are potential controls for testing whether $Freeride$ is "as good as randomly assigned". Since we know which variables were important for the amalgamation reform from the proposal of 1962, we have very good candidates for that test.[22] All nominal values are deflated to 1962 SEK by using the CPI. The theoretical model does not make a distinction between change in long-term debt or short-term debt. It is likely that long-term debt captures most of the free riding behavior, since it can be used to provide local goods such as sports stadiums and alike. These types of investments provide utility to the old municipality in the future. Given the restriction that long-term debt could not

[21] It sometimes happens that small parts (i.e. some parishes) of a municipality amalgamate into a different unit than the major part of the municpality. Since I have no data at the parish level, I classify an amalgamating municipality according to its major part.

[22] For municipalities created in the period 1963-1968, I report the initial values.

be used for consumption, spending could mainly be financed through taxes or short-term debt. If the free riding motive is at work, a municipality should prefer short-term debt to taxes. However, short-term debt must be honored regularly, which should mitigate the free-riding effect. Yet, we can expect a municipality to roll over short-term debt in the very last year before the amalgamation. Lastly, short-term debt could be hard to exploit for a municipality if private companies are credit constrained. For simplicity, I will concentrate on the sum of short- and long-term debt, but I will also explore this potential difference in the subsequent analysis section

Taking a closer look at Table I, I have divided the outcome variable $\Delta DEBT$ into two sub groups. $\Delta DEBT_{70-68}$ is the change of per capita debt for the municipalities amalgamating 1970/71 and $\Delta DEBT_{73-68}$ is the change of per capita debt for the municipalities that amalgamate in 1973/74 or are not subject to amalgamation. We see a clear difference for these variables between the groups. The municipalities amalgamating already after two years, 1970/71, only accumulates 132 SEK on average, but where the other groups consisting of those amalgamating in 1973/74 or not amalgamating at all, accumulate approximately 250 % more in debt.

Furthermore, we can conclude that there is substantial variation in the incentive to free ride. *Freeride* has an average of around 0.66 but a standard deviation of 0.32. As previously discussed, the proposal of 1962 aimed at creating larger municipalities centered around economic geographic nodes, where the node is understood as a place with a high population density. Thus, a population density measure is needed. Table I reports the percentages living in central locations (cities or small towns), denoted *Population density*. Yet, the most important factor for the committee was population size and the average municipality in Sweden had about 9086 inhabitants in 1962. The huge standard deviation indicates that the larger cities are substantially larger than a normal sized municipality. Furthermore, the committee argued that the new municipalities should be more dispersed with regard to occupational character. I include two measures for occupational character: share of the working population in the agricultural sector and alike; and share of the working population in the manufacturing sector and alike. Regarding taxes, the tax base, the tax base per capita as well as the tax rate are presented, where the tax base is measured as taxable income.

Table I
Economic Variables

Variables	N	Mean	S.D.
$\Delta DEBT_{70-68}$	525	132.149	334.697
$\Delta DEBT_{73-68}$	323	213.914	941.590
$Freeride$	848	.661	.321
Population density	848	.467	.299
Population	848	9086	34233
Share in agricultural sector	848	.286	.203
Share in manufacturing sector	848	.327	.198
Tax rate	848	9.890	1.762
Tax base	848	477406	2594048
Tax base per capita	848	37.239	11.963

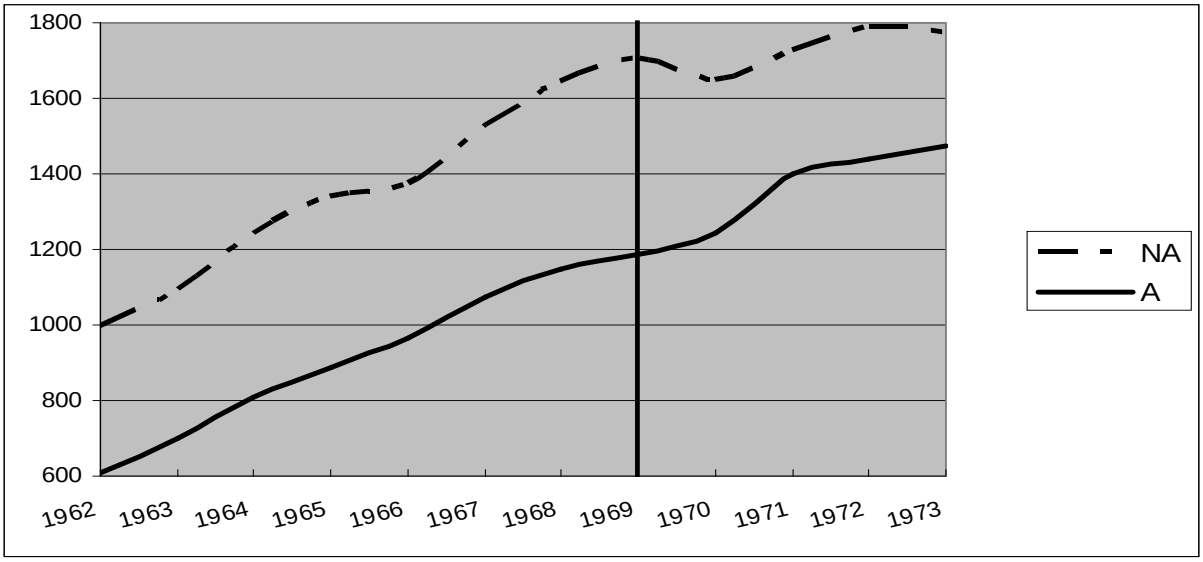
5 Results

This section first presents graphical evidence. Second, regression results based on (9) are provided. The main reason for the graphical analysis, except for investigating a potential effect, is to provide evidence for parallel trends before the reform. With the regression analysis, we make systematic tests, but also check if $Freeride$ is "as good as randomly assigned".

5.1 Graphical Evidence

One simple way of illustrating the potential effect of a reform when using the difference-in-difference approach is to plot the level of the variable of interest over time for different treatment groups. Figure II shows the level of per capita debt over the years 1962 to 1973 for those who never amalgamate (NA) and the municipalities amalgamating at some time within the period (A) and corresponds to the binary treatment case as shown in Figure I. Clearly, NA starts out with a higher per capita debt than the A (997 vs. 609 SEK). Yet, the trends look rather similar until 1969, when the law that forced municipalities to amalgamate was passed. The change in the trend in 1969 indicates an effect of the law of about the size of 200 SEK. In relation to the average level of debt in 1968, this is approximately 17 %. However, the free riding effect is not precisely measured by this crude division. We know from the model that municipalities that amalgamate should have different incentives to free ride.

Figure II
Real Per Capita Debt in SEK, 1962-1973

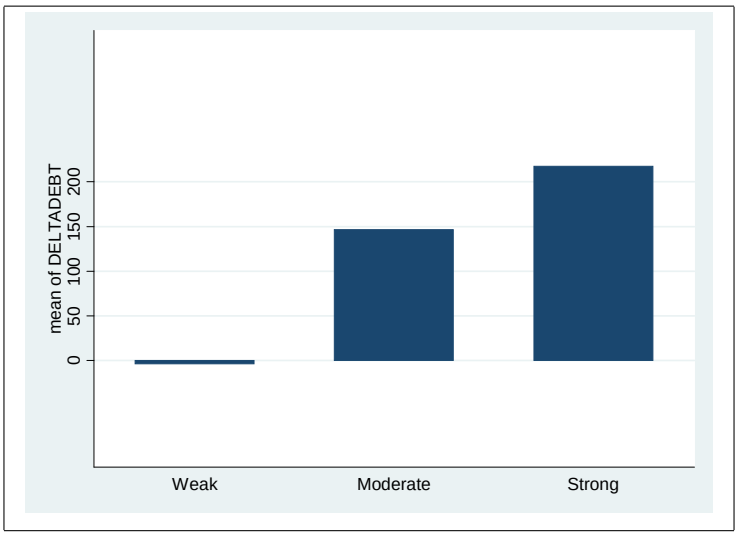


More precisely, the model predicts a monotone positive relationship between the incentive to free ride and the change of debt, not just an effect of the reform as such. This is to say that the debt policy of a municipality with very weak incentives to free ride should be more similar to the policy of a municipality that is not amalgamating than to the policy of a municipality with strong incentives to free ride, everything else equal. Thus, I argue that in order to believe that the common pool problem is the underlying mechanism explaining the increase in debt, we should find a monotone positive relationship between the incentive to free ride and the change of debt. Let us use the structure that our economic model gives at hand and divide the sample into thirds with respect to the incentive to free ride. "Weak" denotes the municipalities with weak incentives to free ride by $Freeride \in [0.0, 0.33]$, "Moderate" are the muncipalities having $Freeride \in (0.33, 0.66]$ and "Strong" those having $Freeride \in (0.66, 1)$.[23] In the subsequent regression analysis, the full continuum of $Freeride$ is, of course, imposed in line with the model but for illustrative reasons the graphical exposition divides the municipalities into thirds.

Figure III shows clear evidence in favor of the prediction of the model. The municipalities with a strong incentive to free ride in fact on average acquire 200 SEK more debt than those with a weak incentive. Evaluated as the share of the average level of per capita debt for all municipalities in 1968, i.e. the year before the law, it is approximately 17 %.

[23] Those municipalities that are amalgams, i.e. newly created in 1971, are dropped. However, the figures are similar when these are included.

Figure III
$\Delta DEBT$. Sorted by Incentive to Free Ride.



It is of further interest to divide the municipalities on the basis of the amalgamation year. In figure IV, the municipalities are ordered by amalgamation year, 1970/71 and 1973/74, respectively. The hypothesis is that the longer a period a municipality can free ride, the larger is the effect. Moreover, it is reasonable to think that the municipalities amalgamating in 1973/74 are the most reluctant to the amalgamation, which might influence the magnitude of the free riding effect. Moreover, since investments take some time to plan and since long-term debt must be approved, we expect a smaller effect of the municipalities that amalgamate already in 1970/71.

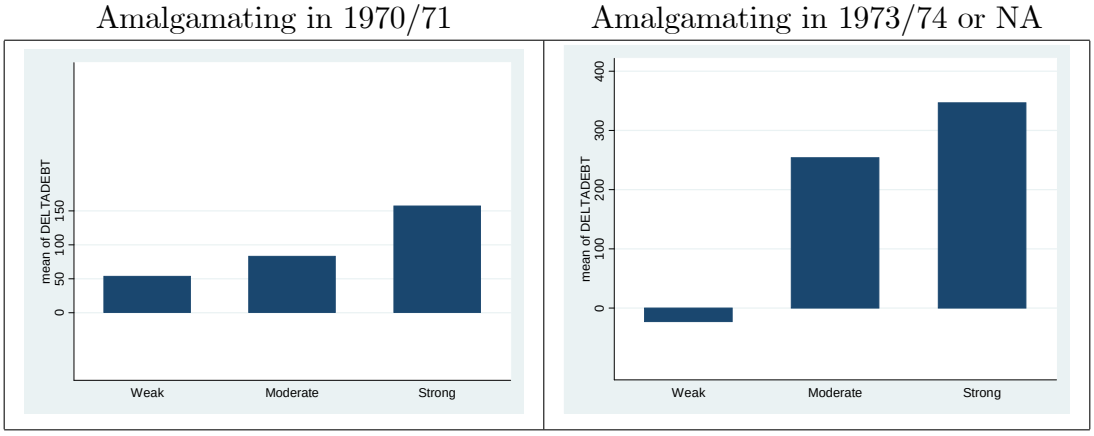
Figure III shows the expected pattern for both groups.[24] The group amalgamating in 1970/71 and has strong incentives to free ride, acquire approximately 100 SEK or 300 % more in debt on average than the municipalities with a weak incentive to free ride. In relation to the average level of debt in 1968, before the law was passed, this is approximately 9%. The municipalities with strong incentives to free ride that amalgamate in 1973/74, acquire approximately 350 SEK more per capita debt than the municipalities with weak incentives. In relation to the average level of debt in 1968, this is approximately 30%.

The fact that the change in debt is larger for the municpalities amalgamating in 1973/74 is reasonable as argued above. An average municipality with a strong incentive, which amalgamates in 1973/74, acquires approximately 100 % more debt than a municipality with a strong incentive but that is amalgamating in 1970/71.[25]

[24] The picture is not driven by outliers. Removing them does not change the relation.

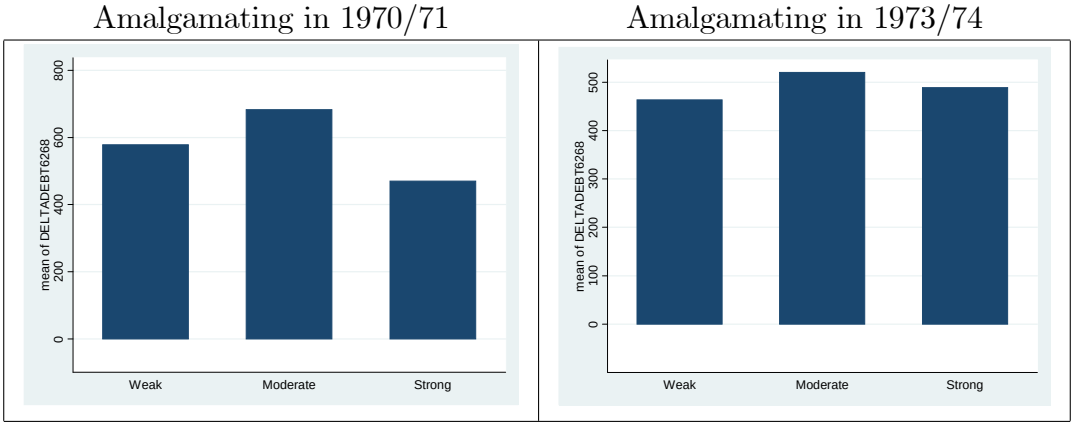
[25] Note that the increase in debt for the group amalgamating in 1973/74, which have weak incetives, is lower than for the group with weak incetives amalgamating in 1970/71. However, this is driven by the fact that the group with weak incentives that is amalgamting later consists of all the muncipalities with

Figure IV
$\Delta DEBT$. Sorted by Incentive to Free Ride & Amalgamation Year



Another question is whether the relation between the incentive to free ride and the debt policy is spurious. One way of investigating this is to calculate the change in debt for some period before the reform. I have done this for various periods, but in general no monotone relationship appears. This gives further graphical support for parallel trends before the reform when dividing the groups based on the incentive to free ride. Figure IV shows one example for change in debt between 1962-1968.

Figure IV
$\Delta DEBT_{68-62}$. Sorted by Incentive to Free Ride & Amalgamation Year



The graphical analysis shows there to be a strong positive relationship between the incentive to free ride and change of debt in line with the model. Moreover, it is reassuring

no incentives to free ride, whereas the group with weak incetives in the group amalagamating in 1970/71 has none of those. Removing those municipalities with no incentive to free ride, the level is higher for those amalgamating later.

that graphically, we find evidence of parallel trends. Lastly, the effect is potentially economically large. The next subsection further investigates the effects by regression analysis.

5.2 Regression Results

In this subsection, I will use (9) as the baseline specification. To recapitulate, I use OLS on:

$$\Delta DEBT_{it} = \theta + \beta Freeride_{it} + \mathbf{X}\gamma + v_{it}. \tag{10}$$

where $\Delta DEBT_j$ is defined as before, $\mathbf{X}$ contains the pre-reform characteristics potentially related to the reform as discussed previously, county-specific effects and intercept.[26] Our model predicts that there should be no difference in the incentive to free ride between a municipality that is amalgamating and is extremely large, relative to the amalgam, and a municipality that is not subject to amalgamation. Thus, we include all 848 observations in our main analysis. The results are presented in Table II.

In the first specification, the coefficient of the incentive to free ride without any controls shows the expected sign and is highly significant with the point estimate of 298. Thus, a municipality with very strong incentives to free ride acquires 298 SEK more per capita debt than a municipality with no incentive to free ride. In relation to the average level of debt in 1968, this is approximately 26 %. In 2006 year values, this is about 2850 SEK or 400 USD . Since the average of $Freeride$ is 0.661, the effect evaluated at the mean is approximately 197 SEK, which is roughly 17 % of the level of debt in 1968.

Including all variables related to the reform in the second specification does not change the interpretation qualitatively and very little quantitatively. This suggests that the difference-in-difference approach is sufficient. If we had seen a large discrepancy between specifications 1 and 2, we would doubt that the difference-in-difference estimator was appropriate. Formally, an F-test testing if all the coefficients are equal to zero cannot be rejected at any reasonable significance level.[27] The effect is of the magnitude of 249 SEK, which is approximately 21 % of the average level of debt in 1968. Evaluated at the mean of the incentive to free ride, the effect is around 164 SEK, which is approximately 14 % of the level of debt in 1968.

There are some plausible reasons why the effect of the incentive to free ride might differ between the groups that are amalgamating. First, time in treatment might be important. For example, municipalities might have difficulties in borrowing as much as preferred in one year since the municipality could be credit constrained. Moreover, the law was passed in 1969 and the municipalities that amalgamate had already passed their budget for that year. Hence, these municipalities in fact only had one year for acquiring debt,

[26] County effects are introduced since a municipality must be a consistent area, which means that most amalgamations took place within the same county.

[27] The F-statistics takes the value 0.52 with the corresponding p-value of 0.821

if they did not foresee the law. Thus, a longer time period in treatment might increase the effect. Moreover, it might be the case that the groups differ in some dimension not controlled for by the control variables.[28] Specification 3 shows the result from including an interaction of $Freeride$ with a dummy, 70, where 70 takes the value of one for those amalgamating in 1970/71. All controls are also interacted. For brevity, I suppress the estimates of the controls. If the arguments above are true, we would then expect that including $Freeride*70$ should increase the point estimate of $Freeride$ and give a negative estimate for $Freeride*70$. In fact, the point estimate of $Freeride$ increases to 455 SEK and the point estimate of $Freeride*D70$ is negative of the size -355 SEK. Thus, a municipality with a very strong incentive to free ride that is amalgamating in 1973/74 acquires 455 SEK more debt than a municipality with no incentives to free ride. For the group amalgamating in 1970, the point estimate is only of the size $455-355=100$ SEK. Given the set up of the reform, I cannot distinguish between the proposed mechanisms that makes the free riding effect smaller for muncipalities amalgamating earlier, but we can conclude that there is clear evidence of a significantly lower effect although that the positive relation remains.

As previously discussed, we could potentially expect a larger effect on long-term debt than on short-term debt. In specifications 4 and 5 in Table II, the results are shown from using the change in short- and long-term debt as dependent variables.[29] The incentive to free ride does not determine the change of short-term debt at any reasonable significance levels. Moreover, the point estimate is small, however with the expected sign. However, using long-term debt as the dependent variable, we get closer to the previous estimates, both with regard to the significance level and the size of the point estimate. Thus, most of the effect goes through acquiring long-term debt.

Our model assumes that the increase in debt is used to provide some type of local public good. As previously argued, it seems most likely that a municipality about to amalgamate would like to bias its use of debt to long-term investments in order to enjoy utility for some future period. Moreover, since we know that long-term debt cannot be used for consumption, it is reasonable that using a measure for long-term investments should yield similar results. Instead of using $\Delta DEBT_j$, a good candidate would be the change in long-term assets. The reason for not only using long term-assets as the main dependent variable in the analysis instead of the change in debt is two-fold. First, there are other ways of directing resources to the municipality than through acquiring long-term assets. Second, the way long-term assets are reported is more arbitrary since it is not priced at the market and the borderline between short- and long-term assets is sometimes non-trivial.[30] This means that we can expect measurement error in this variable and larger

[28] One argument would be that those amalgamating earlier are those that can co-operate at the lowest cost and/or are able to build trust, which might mitigate the free-riding effect.

[29] There is missing data on the long- and short-term debt for four municipalities. Only the aggregate is reported. These municipalities are excluded.

[30] A linear regression of Change in debt on Change in long-term assets yields a positive and significant

standard errors. However, it is reasonable that the point estimate should be positive. The last specification uses change in long-term assets as the dependent variable where we use the same definition, i.e. the change from the level of 1968 up to the year of amalgamation. Clearly, the point estimate of *Freeride* has the expected sign, but with larger standard errors.[31]

Table II
Effect of the Incentive to Free Ride on the Change of Debt and Change of Assets[1]

	Main Analysis		70/71	Change in debt(short)	Change in debt(long)	Change in assets(long)
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
Freeride	298 (112)***	249 (89)***	455 (146)***	67 (68)	181 (56)***	166 (98)*
*Freeride**70			−355 (180)**			
Tax rate		−10 (15)	[2]	−9 (10)	−1 (10)	−3 (19)
Tax base		0 (0)	[2]	0 (0)	0 (0)	0 (0)
Tax base per capita		−4 (4)	[2]	−4 (3)	0 (2)	−6 (4)*
Population		−0 (0)	[2]	−0 (0)	−0 (0)	0 (0)
Population density		13 (153)	[2]	135 (96)	−121 (117)	−510 (454)
Share agricultural		−285 (202)	[2]	−146 (120)	−137 (117)	−1366 (1065)
Share manufacturing		−75 (140)	[2]	−156 (117)	74 (97)	−272 (324)
County effects		yes	yes	yes	yes	yes
N	848	848	848	844	844	845
R^2	0.022	0.098	0.142	0.089	0.115	0.078

[1]Robust standard errors in parentheses

*** Significant at the 1% level,**at the 5% level,*at the 10% level

[2]Suppressed for brevity. The controls have also been interacted with the dummy 70

The results from the regression analysis correspond to the results from graphical analysis. The difference-in-difference approach seems to be reasonable as the estimates are not substantially altered by adding the variables that influenced the amalgamation reform. Lastly, the effects of free riding are found to be large and significant. The next section,

coefficient of 0.26. R^2 is about 0.12.

[31]We lose three observations due to missing data.

however, deals further with the interpretation of the effects and the robustness of the results.

6 Robustness

Robustness checks are carried out in this section. First, we consider potential caveats with the reform. We have previously not made any distinction among the municipalities that were not affected by the law. However, this group consists of two types of municipalities, namely those originally never chosen to amalgamate and those 35 that voluntarily completed the amalgamation before 1969. I define the first group as "NA" in accordance with Figure I and the latter is defined as "Completed". Thus, it could be argued that the "completed" municipalities have selected themselves into non-treatment and if this group is non-random with respect to debt policy, this could drive the results. Consequently, I will run regressions on a restricted sample, excluding these. Moreover, Table III presents regression results when we restrict the sample to the municipalities that are amalgamating only, i.e. excluding both "Completed" and "NA". Last, not all amalgamations that took place in the voluntary period ended in a complete municipality, i.e. included some, but not all, amalgamating partners. Thus, we would also like to run a regression with only the municipalities that were totally unaffected by voluntary amalgamations, i.e. were geographically intact within the period of 1962-1969.

In specification 1, excluding voluntary completed municipalities, we see a drop in the estimate of $Freeride$. However, the effect remains positive, large and significant. Specification 2 further restricts the sample and only looks at the municipalities experiencing a change in the incentive to free ride. The estimates of the incentive to free ride are of the same magnitude baseline specification and the effect is still highly significant. In specification 3, we restrict the sample to the municipalities that were geographically intact within the period of 1962-1969. We lose some more observations, but the point estimates are in a similar range as the baseline specification and highly significant. Specification 4 further restricts the sample, and excludes the group "NA". Thus, we use the muncipalities that were geographically intact and did amalgamate the period where the law applies. The point estimate remains in the same range and is significant at the 5 % level.

Table III
Robustness

Independent variables	Excluding completed	Excluding NA & completed	Geographic. intact	Geographic. intact. Excluding NA	$\Delta DEBT_{62}$
	(1)	(2)	(3)	(4)	(5)
Freeride	186 (70)***	235 (91)***	194 (75)***	248 (102)**	284 (112)**
Tax rate	−2 (12)	5 (13)	4 (15)	8 (16)	41 (24)*
Tax base	0 (0)	0 (0)	0 (0)	0 (0)	−0 (0)
Tax base per capita	−2 (3)	−1 (3)	−4 (5)	−2 (6)	8 (6)
Population	−0 (0)	−0 (0)	−0 (0)	−0 (0)	0 (0)
Population density	−58 (130)	−59 (140)	−32 (134)	−23 (147)	143 (199)
Share manufacturing	22 (116)	−4 (108)	154 (222)	82 (228)	−87 (292)
Share in agricultural	−198 (187)	−182 (190)	−94 (233)	−101 (246)	−202 (338)
County eff.	yes	yes	yes	yes	yes
N	813	771	736	694	694
R^2	0.085	0.095	0.083	0.0890	0.110

[1]Robust standard errors in parentheses
*** Significant at the 1% level,**at the 5% level,*at the 10% level

Moreover, setting the pre-treatment period to 1968 might be incorrect. The law was passed with a very slight majority, and with about a half of the municipalities protesting, but since expectations cannot be observed, we do not know how far back the law was anticipated.[32] Evidence on anticipation could be investigated by postulating a model that takes the 1968 level as the final level of debt and see how much of the differential $DEBT_{68} - DEBT_{62}$ can be explained by *Freeride*. Naturally, we vary the differential to be $DEBT_{68} - DEBT_{63}$ or $DEBT_{68} - RCAPDEBT_{64}$ etc. I find no significant effect of *Freeride* on these different types of measures when including the controls. Thus, it is reasonable that the law that forced municipalities to amalgamate did not affect debt policy before it was passed. Furthermore, it gives evidence that *Freeride* is not spuriously related to our dependent variable.

Defining 1968 as the pre-treatment year might lead us to draw the wrong conclusions if the parallel trend assumption is violated. For example, if municipalities with a strong

[32]See, for example, Gustafsson (1984).

incentive to free ride for some reason have a cyclical debt policy, the pre-treatment year might be crucial for our conclusions. The estimated effect is then not a causal effect of the reform. Prolonging the treatment period is thus a robustness test, in the sense that we investigate how sensitive the analysis is to the choice of pre-treatment year. Specification 5 in Table III shows the results of using level of $\text{Debt}_{\text{amalgamation year}}$- level of Debt_{62} as dependent variable for those amalgamating in the period where the law applies. The point estimate is significant at the 5% level and is in a similar range.[33] The results are also robust when including number of amalgamating partners.[34]

Furthermore, I have performed robustness checks with regard to different functional forms of the different controls. The free riding effect remains significant at the 1 % level but drops somewhat.[35] I have considered the annual change of debt and used different panel estimators such as the fixed and random effects with consistent results. Furthermore, I have removed some outliers such as large cities and also those municipalities that have combined the decision body of the municipality with the county council.[36] In general, the point estimate remains large, positive and highly significant.

Lastly, I have done arbitrary checks on competing models that might be the correct underlying process generating data. Alternative models are models related to free riding on the electorate within a locality such as Tabellini and Alesina (1990) and Persson and Svensson (1989). Pettersson-Lidbom (2001) shows that the first model is not consistent with Swedish municipal behavior in the period after the amalgamation. Moreover, I find no indirect evidence in line with Persson and Svensson (1989) when allowing the left wing and the right wing to respond differently.[37]

7 Conclusion

In the twentieth century, there was a trend towards larger local governments through amalgamations in the western world. Amalgamations provide potential economic benefits but might also give rise to costs driven by opportunistic political behavior. This paper

[33] Note that we lose the municipalities that did not exist in 1962. Including the 42 municipalities that were not affected by the law decreases the esimate to 213, but it is still significant at the 6 % level.

[34] One could think that fewer amalgamating partners could influence the results, holding the incentive to free ride constant, since it might be easier to impose social pressure if the localities were few. However, there is no such evidence.

[35] I have tried with both quadratic and qubic forms of all controls.

[36] The following municipalities had combined decision bodies: Stockholm, Gothenburg, Malmö, Helsingborg and Gävle in 1962; Stockholm and Gothenburg in 1963-66; Stockholm, Gothenburg and Malmö in 1967-70; Gothenburg, Malmö and Gotland in 1971-74.

[37] I can also directly test for competing theories under the assumption that the reform affects the incentives differently. When trying different reasonable measures for the re-election probability, I find no effects in line with Persson and Svensson (1989) or Tabellini and Alesina (1990). Under the assumption that the total size of the population is related to future scale effects, I can also test if the effects are capturing smoothing behavior. However, there is no such evidence.

argues that the extensive amalgamation reform of 1969, which forced a vast majority of Swedish municipalities to amalgamate, gave rise to the same free riding incentives as in a basic common pool model. I use a difference-in-difference approach to evaluate the effect. Since the reform was based on social geography methods, we can also check for randomization within the framework. The free riding effect is significant and large. Evaluated at the extreme values of the incentive to free ride, the effect is of the magnitude of 298 SEK, which is approximately 26 % of the average level of debt in 1968. Evaluated at the mean of the incentive to free ride, the effect is around 197 SEK, which is approximately 17 % of the level of debt in 1968. The municipalities that did amalgamate earlier also free ride less, which is consistent with the notion that the time in treatment is of importance. In line with the theory, we expect a municipality to invest in large projects such as sports stadiums and alike in order to enjoy utility for a long future period, which is confirmed by the study. Moreover, the results are robust and survive numerous specifications and different types of estimators. Municipality representatives thus seem to care about their region and behave opportunistically in the geographical sense as predicted by theory. This paper shows that when the geographical identity and the common pool of future taxes are clearly defined and when the timing and decision procedure is close to the basic common pool model, politicians behave in line with it.

The policy conclusion from this is rather evident and is connected to future research. If larger municipalities are more efficient and can enjoy scale economics, the free riding incentives before an amalgamation can offset some of the potential gains. Having one *large* stadium in a municipality might be efficient if there are scale effects, but not two *medium* sized ones. Thus, voluntary amalgamations or more constrained amalgamations seem to be the most efficient way, given the goal of large *efficient* local governments. Hence, one of the reasons why previous research shows little evidence of efficiency after amalgamations might be that the new localities are suffering from sub optimal investments before the amalgamation, which is a natural next step for future research. If larger municipalities are not more efficient, the opportunistic behavior before an amalgamation adds an extra cost to the cost-and-benefit analysis of amalgamations.

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8 Appendix: Statistical Sources and Definition of Variables

The data is collected from the sources: *Kommunernas Finanser* (1962-1974) and *Årsbok för Sveriges Kommuner (*1962-1974), Statistics Sweden, Stockholm. Information on debt and long-term assets is collected from *Kommunernas Finanser* 1962-1974. Population, population density, share working in the agricultural and the manufacturing sector and alike, tax rate and tax base are collected from *Årsbok för Sveriges Kommuner* 1962-1974. Furthermore, Ivarsson (1992) has been useful for determining with what other municipality a municipality is amalgamating with, All nominal terms are deflated by CPI with 1962 as the base year.

Freeride is defined as $1 - \frac{N^j}{N}$, where N^j is the population size in j and N is the size of the amalgam.[38]

Change of $debt_{68-70/71}$ is the per capita debt level of 1970/71, minus the debt level of 1968

Change of $debt_{68-73/74}$ is the per capita debt level of 1973/74, minus the debt level of 1968

Change of debt is the level of per capita debt in 1973/74 or 1970/71, minus the debt level of 1968.

Population density is the population density. The population density is a measure of the share living in a densely populate area (tätort). It is a dichotomous variable divided into 8 groups, where the first group A means no population in a densely populate area. B means 0.1- 9.9 % living in a densely populate area and so forth up to the last group H, where all live in a central location. The averages of the intervals of the groups are used. The variable is calculated from census in 1960 and 1965. I use the values from 1960 for those municipalities existing in 1962.

Tax rate is the tax rate on income from work that the municipality fully decides upon (borgerlig skatt).

Tax base is the tax base which is the sum of the income that is taxable in the municipality.

Tax base per capita is the tax base per capita, which is the tax base divided by population

[38] Sometimes one or some parishes in a municipality do amalgamate into a unit that is different than the unit where the largest part amalgamates. Since there is limited data at the parish level, I ignore this and classify the amalgamation partners considering the largest parts of the former municipalities.

Population is the population in a municipality.

Share in agricultural sector is the share of the working force that worked in the agricultural sector and alike at the time of the census 1960.

Share in manufacturing sector is the share of the working force that worked in the manufacturing sector and alike at the time of the census 1960.

Change in long-term assets is the change in long-term assets, defined in analog with the change of debt .